PATENT ABSTRACTS OF JAPAN

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H04N 5/74

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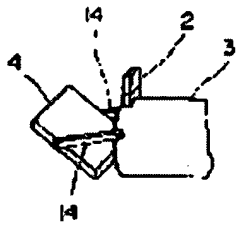
(54) LIQUID CRYSTAL PROJECTOR

(57)Abstract:

PURPOSE: To provide the liquid crystal projector which easily enables remote operations with a single light reception part by providing the light reception part adjacently to a projective lens receiving infrared light emitted from a remote control transmitter.

CONSTITUTION: In the liquid crystal projector provided with a projective lens 3 for projecting images displayed at a liquid crystal panel onto a screen and a light reception part 2 to receive infrared light emitted from the remote control transmitter, the light reception part 2 is provided adjacently to the projective lens 3. Thus, when light emitted from the lens 3 is bent upward by a mirror 4 and projected on the screen provided upward, the infrared light emitted from the remote control transmitter is reflected on the screen, further reflected by the mirror 4 and received at the light reception part 2. Therefore, even when bending the projected light of the lens 3 with the mirror 4, the infrared light emitted from the remote control transmitter and reflected on the screen can be received by one light reception part 2, and the structure can be simplified.



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CLAIMS

[Claim(s)]
[Claim 1] The liquid crystal projector characterized by having approached said projection lens and preparing said light sensing portion in the liquid crystal projector equipped with the projection lens which projects on a screen the image displayed on the liquid crystal panel, and the light sensing portion which receives the infrared light which emits from a remote control transmitter.
[Claim 2] The liquid crystal projector according to claim 1 characterized by preparing the mirror which bends the outgoing radiation light of a projection lens in the front face of a projection lens.
[Claim 3] The liquid crystal projector according to claim 1 or 2 characterized by making a mirror rotatable to the optical axis of a projection lens.
[Claim 4] The projection lens which projects on a screen the image displayed on the liquid crystal panel, The detecting-element material which is a liquid crystal projector equipped with the lens driving member which moves said projection lens to parallel to an optical axis, and the mirror which is prepared in the front face of said projection lens, and bends the outgoing radiation light of said projection lens, and detects the location of said mirror, The liquid crystal projector characterized by having the control-section material which controls the driving direction of said lens driving member with the location of said mirror which said detecting-element material detected.
[Claim 5] A lens driving member is a liquid crystal projector according to claim 4 characterized by being operated by the key stroke section prepared in the projector body or the remote control transmitter.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] This invention relates to the liquid crystal projector which projects an image on a screen using a liquid crystal panel.
[0002]
[Description of the Prior Art] Conventionally, what is called the liquid crystal projector which used the liquid crystal panel as a color picture indicating equipment of a projection mold is developed. The color is separated into three colors of red light, green light, and blue glow with a dichroic mirror, and this liquid crystal projector arranges a liquid crystal panel to the optical path of each decomposed color, after making a parallel ray light from the light source of a xenon lamp etc. by the optical member. And after making the red image, green image, and blue image of the image to project form in the liquid crystal panel of each optical path and making the beam of light of each optical path it at red color image light, green color image light, and blue color image light, each **** is compounded with a dichroic mirror and a screen is made to carry out amplification tracing of the synthetic light through a projection lens.
[0003] In addition, by the easy liquid crystal projector, a configuration displays a color picture on the liquid crystal panel of one sheet, and carries out incidence to this liquid crystal panel of one sheet, without making the color of the light from the light source separate, and some which display the transmitted light of the liquid crystal panel of one sheet on a direct screen have it.
[0004] thus, high [corresponding to / since the liquid crystal panel and the light source whose image display section itself is the image display section like the projector which used the conventional CRT with having constituted unlike what served as the light source were another object / the brightness of the light source] -- since resolution is decided with a liquid crystal panel while a brightness image is obtained, it becomes possible to project the image of high brightness and high resolution.
[0005] Moreover, there are some which have a remote control transmitter for carrying out long distance actuation in this kind of projector. However, it is difficult to turn a transmitter to a projector and to operate it with the front, back, and the upper part, since the installation of a projector is various. For this reason, discharge infrared light toward a screen from a transmitter, and it is made to reflect with a screen, and as shown in drawing 9 , incidence is carried out to the light sensing portion 2 prepared in the front face of a projector 1.
[0006] Furthermore, in order to change the image projection direction into this kind of projector, there are some which inclined in the front face of the projection lens 3 of a projector 1 to the optical axis, and attached the reflective mirror 4 in it as shown in drawing 10 . There are what was built in in the projector 1, and a thing attached in the front face of a projector 1 as an option in this reflective mirror 4.
[0007] On the other hand, as these people proposed as a patent application of a reference number S91105989 on April 27, Heisei 4, arrangement of a projector is not appropriate, and in order to prevent distortion occurring on the projection image on a screen, there is also a thing of a configuration of having made the projection lens 3 movable to parallel at the optical axis.
[0008]

[Problem(s) to be Solved by the Invention] However, as shown in drawing 10 , when the reflective mirror 4 is formed in the front face of the projection lens 3 and the light sensing portion 2 is formed in the front face of a projector 1, it reflects with a screen and incidence of the infrared light discharged from the remote control transmitter toward the screen on the optical axis of the reflected light of the reflective mirror 4 is carried out to the top face of a projector 1 in which the light sensing portion 2 is not formed. For this reason, there was a problem that light-receiving became impossible. Although this problem was solved when forming two or more light sensing portions 2, there was a design top problem of the design top of a projector and a circuit, and implementation was difficult.
[0009] When the projection lens 3 is moved to an optical axis by the actuation key at parallel and a key stroke performed on the other hand while the user looked at the projection image on a screen, when the projection image on which it was projected on the screen by the reflective mirror 4 was [the upper and lower sides or right and left] reversed in order to prevent distorted generating of the display image on a screen, a possibility that the migration direction of the projection lens 3 may become to reverse to the right migration direction was.
[0010] This invention was made in view of such a situation, and the 1st invention only prepares one light sensing portion in the projector in which the reflective mirror was prepared, and aims at offering the liquid crystal projector which can operate by remote control easily.
[0011] Moreover, the 2nd invention aims at offering the liquid crystal projector which can carry out the key stroke of the migration direction of the projection lens for distorted amendment etc. in the direction of the right, also when a projection image is in the condition that it was reversed in the direction of four directions.
[0012]
[Means for Solving the Problem] A liquid crystal projector according to claim 1 is characterized by having approached the projection lens 3 and forming a light sensing portion 2 in the liquid crystal projector equipped with the projection lens 3 which projects on a screen the image displayed on the liquid crystal panel, and the light sensing portion 2 which receives the infrared light which emits from a remote control transmitter.
[0013] A liquid crystal projector according to claim 2 is characterized by forming the mirror 4 which bends the outgoing radiation light of the projection lens 3 in the front face of the projection lens 3.
[0014] It is characterized by a liquid crystal projector according to claim 3 making a mirror 4 rotatable to the optical path of the projection lens 3.
[0015] The projection lens 3 which projects on a screen the image as which the liquid crystal projector according to claim 4 was displayed on the liquid crystal panel, The 1st motor 23 and 2nd motor 24 as a lens driving member which move the projection lens 3 to an optical axis at parallel, The switches 61 and 63 as detecting-element material which is a liquid crystal projector equipped with the mirror 4 which is prepared in the front face of the projection lens 3, and bends the outgoing radiation light of the projection lens 3, and detects the location of a mirror 4, It is characterized by having the system controller 31 as control-section material which controls the driving direction of the 1st motor 23 and the 2nd motor 24 with the location of the mirror 4 which switches 61 and 63 detected.
[0016] A liquid crystal projector according to claim 5 is characterized by motors 23 and 24 being operated by the key stroke sections 41 and 45 prepared in projector 1 body or the remote control transmitter.
[0017]
[Function] In a liquid crystal projector according to claim 1 to 3, it reflects with a screen, it reflects further by the mirror 4 prepared in the front face of a projector lens 3, and incidence of the infrared light emitted from the remote control transmitter is carried out to a light sensing portion 2. Since a light sensing portion 2 approaches a projector lens 3 and is prepared at this time, incidence of the infrared light reflected by the mirror 4 can be carried out to a light sensing portion 2.
[0018] When the light which carries out outgoing radiation to claims 4 and 5 from a projector lens 3 by the mirror 4 in the liquid crystal projector of a publication bends, the projection image which fluctuated or was [right-and-left] reversed has copied out on the screen and a switch 61 detects the location of a

mirror 4, the 1st and 2nd motor 23 and 24 is reversed. For this reason, while a user looks at the projection image on a screen, when performing a key stroke, gate correction etc. can be made by pressing the key of the same direction as the direction of [on a screen].
[0019]
[Example] Hereafter, the example of the liquid crystal projector of this invention is explained with reference to a drawing.
[0020] The 1st configuration of the example of invention is shown in drawing 1 thru/or drawing 4 , and the 2nd configuration of the example of invention is shown in drawing 4 thru/or drawing 8 . In these drawings, the same sign is given to the parts of drawing 9 and the conventional example shown in 10, and a corresponding part.
[0021] The configuration of the projection direction adjustable mirror built-in projector 1 is shown in drawing 1 thru/or drawing 3 . The location of a projector lens 3 is countered and apertures 12 and 13 are formed in the ****-like the front face and top face of a housing 11 which are shown in drawing 3 , respectively. in a housing 11, as shown in drawing 1 and drawing 2 , the projection lens 3 contains -- having -- **** -- the optical axis of the projection lens 3 -- an aperture 12 -- it passes along the core mostly. The reflective mirror 4 is supported rotatable through one pair of arms 14 by the front end of the projection lens 3. And as shown in drawing 1 , when the reflective mirror 4 considers as the include angle of 45 degrees to the optical axis of the projection lens 3, outgoing radiation of the reflected light is carried out to the upper part through an aperture 13. Moreover, if the reflective mirror 4 is lowered and it is made to evacuate from the optical axis of the projection lens 3 as shown in drawing 2 , the light emitted from the projection lens 3 will go straight on, and outgoing radiation will be carried out from an aperture 12. Moreover, the light sensing portion 2 is attached so that a light-receiving side may become a right angle to the optical axis of the projection lens 3 at the front end periphery of the projection lens 3.

[0022] As the above-mentioned configuration is shown in drawing 1 , the light emitted from the projection lens 3 bends up by the reflective mirror 4, when projected by the screen which was formed in the upper part and which is not illustrated, it is reflected by the screen, it is further reflected by the reflective mirror 4, and the infrared light emitted from the remote control transmitter is received by the light sensing portion 2. Moreover, as shown in drawing 2 , incidence of the infrared light which the reflective mirror 4 had evacuated from the optical axis of the projection lens 3, emitted from the remote control transmitter when the light emitted from the projection lens 3 went straight on, and was reflected by the screen is carried out to a light sensing portion 2 as it is, and it is received.
[0023] According to this example, even when it bends the projection light of the projection lens 3 by the reflective mirror 4, it can emit from a remote control transmitter and the infrared light reflected on a screen can be received by one light sensing portion 2. Therefore, structure becomes easy and design nature's improves.
[0024] Other examples of the 1st invention are shown in drawing 4 . At this example, the reflective mirror 4 is attached with the same mounting structure as what is shown in the front face of a housing 1 at drawing 1 by the case where it attaches in a projector 1 by making the reflective mirror 4 into an option. And the light sensing portion 2 is formed in the location which can counter the mirror 4 of the front face of a housing 1. The same effectiveness as the case of said example is acquired by this example.
[0025] The 2nd configuration of the example of invention is shown in drawing 5 thru/or drawing 8 . In drawing 5 , in the housing of a projector 1, the projection lens 3, the focal lens 21, and the zoom lens 22 are formed on the same optical axis, and the reflective mirror 4 is attached rotatable ahead of the projection lens 3. The projection lens 3 is moved to the upper and lower sides and a longitudinal direction by the 1st and 2nd motors 23 and 24. Moreover, the focal lens 21 and a zoom lens 22 are moved in the direction of an optical axis by the 3rd and 4th motors 25 and 26, respectively. Furthermore, rotation actuation of the reflective mirror 4 is carried out by the 5th motor 27. And actuation control of each motor 23 thru/or 27 is carried out by the system controller 29 through the motor drive circuit 28. Furthermore, the sensors 30, 31, 32, 33, and 34 which detect each movement magnitude are formed in

the reflective mirror 4 and each lenses 3, 21, and 22, and it connects with the system controller 29 electrically, respectively.
[0026] the key stroke section 41 shown in drawing 6 is formed in the projector 1, and the signal over the 1st motor 23, 2nd motor 24, and 5th motor 27 is switched to the key stroke section 41 -- the up subvolution switch 42, the right-and-left reversing switch 43, and MIRASUITCHI 44 are formed, respectively. Moreover, the keys 45a and 45b which move the projection lens 3 in the vertical direction by the motor 23, and the keys 46a and 46b which move the projection lens 3 to a longitudinal direction by the motor 24 are formed. Moreover, as shown also in the remote control transmitter which is not illustrated at drawing 7 , the same key stroke section 51 is formed. And the key stroke sections 41 and 51 are connected to the system controller 31, and E2ROM35 which writes in the conditions set up by the key stroke sections 41 and 51 is connected to the system controller 31.
[0027] On the other hand, the switch 61 which serves as ON when the reflective mirror 4 is built in and the reflective mirror 4 leans 45 degrees to an optical axis, as shown in drawing 8 , and the switch 63 which serves as ON when the projection lens 3 is equipped with the option mirror 62 are formed at the head of the projection lens 3. ON and the OFF signal which are emitted from switches 61 and 63 are inputted into a system controller 31.
[0028] Next, an operation of this example is explained with reference to a table 1.
[0029]
[A table 1]

投射映像状態			本体，リモコン，キー			
MIRROR	上下反転	左右反転	⇩	⇧	⇦	⇨
			TILT・モータ		PAN・モータ	
正面投射 ミラー角度 0°	ON	ON	正転	逆転	逆転	正転
		OFF	正転	逆転	正転	逆転
	OFF	ON	逆転	正転	逆転	正転
		OFF	逆転	正転	正転	逆転
上方投射 ミラー角度 45°	ON	ON	正転	逆転	正転	逆転
		OFF	正転	逆転	逆転	正転
	OFF	ON	逆転	正転	正転	逆転
		OFF	逆転	正転	逆転	正転

[0030] A user operates the key stroke sections 41 or 51, looking at a screen, and makes gate correction of the image projected on the screen. When it is the case where a mirror include angle is 0 times, and 45 degrees, at this time, the hand of cut of the motors 23 and 24 when pressing keys 45 and 46 changes with combination in case the vertical reversing switch 42 and the right-and-left reversing switch 43 are ON and OFF, respectively. That is, when light is projected, for example for a mirror include angle up from the projection lens 3 at 45 degrees, the hand of cut of the motor 23 when pressing a key 45 becomes reverse by setting the vertical reversing switch 42 to OFF. Consequently, the migration direction seen from [of the image on which it was projected] normal, and a key 45 can be made to correspond.

[0031] When the location data which the sensors 31 and 32 of the projection lens 3 detected at this time become the maximum-permissible value of a driving direction, an actuation instruction in the motor drive circuit 30 is made for a stop and an image not to lack a system controller 31. That is, if it continues pressing keys 45 and 46, a system controller 31 will continue transmitting information to the motor drive circuit 30, reading location detection data. If it becomes the maximum to which location detection data were set, even if it continues pressing keys 45 and 46, transmission in a motor drive circuit will be stopped. Henceforth, the change of the motor 23 shown in a table 1 whenever the mirror switch 44, the

vertical reversing switch 42, and the right-and-left reversing switch 43 are pushed, and a forward inversion of 24 is performed, and the condition is written in E2PROM35.
[0032] The content of E2PROM35 remains, even if a power source serves as OFF. Moreover, at the time of the next power-source **** going up, the information on a front final state is read from E2PROM35, and same processing is performed at it. In addition, it begins from the condition of zero mirror include angle, the vertical reversing switch 42, and right-and-left reversing-switch 43OFF at the time of an initial start.
[0033] Even if the image projected by the reflective mirror 4 on the screen is in the condition reversed to the upper and lower sides and a longitudinal direction, the direction of keys 45 and 46 of operation can be made according to this example, to correspond on the basis of the direction which looks at a projection image to normal, when a user moves a projection image vertically and horizontally by the actuation key.
[0034] Although the above-mentioned example explained the case where the gate of the image on which the projection lens 3 was moved and it was projected on the screen was corrected, the same effectiveness is acquired even if it applies to other equipments which can move a projection image.
[0035] Moreover, although the projection lens 3 was moved and the projection image was moved in the above-mentioned example, also when moving the base in which the projector 1 whole or a projector 1 is laid, it can apply.
[0036]
[Effect of the Invention] Since according to the liquid crystal projector according to claim 1 to 3 the projection lens was approached and the light sensing portion which carries out incidence of the infrared light which emitted from the remote control transmitter and was reflected with the screen was prepared as explained above, even when the outgoing radiation light from a projection lens is bent by the mirror, infrared light is reflected by the mirror and incidence can be carried out to a light sensing portion.
[0037] Moreover, since according to the liquid crystal projector given in claims 4 and 5 the location of a mirror is detected and the migration direction of a projection lens was controlled, when the image projected on the screen is reversed to the upper and lower sides and right and left and a key stroke is performed while a user looks at the projection image on a screen, gate correction etc. can be made in the same direction as the direction of [on a screen] by pressing a key.

[Translation done.]

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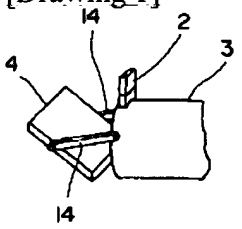
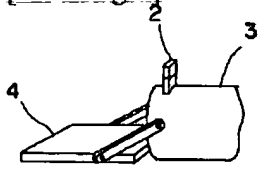
DRAWINGS

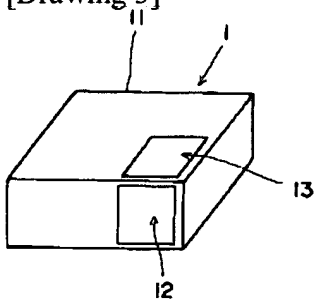
[Drawing 1]



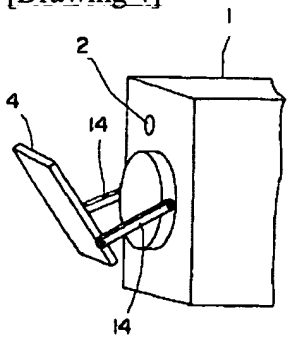
[Drawing 2]



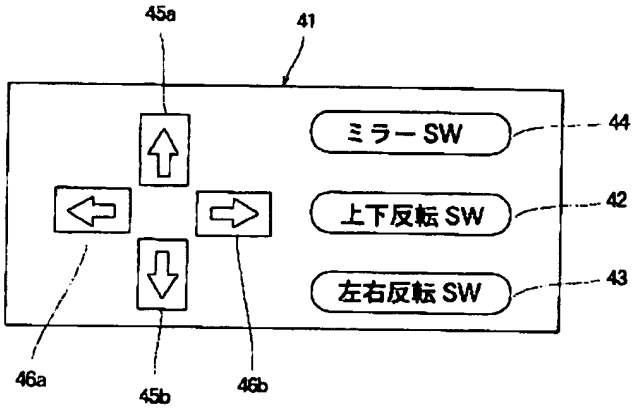
[Drawing 3]



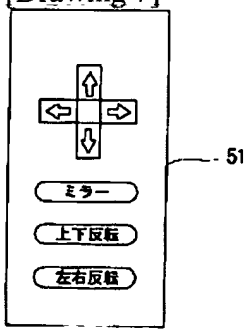
[Drawing 4]



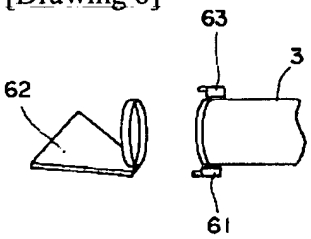
[Drawing 6]



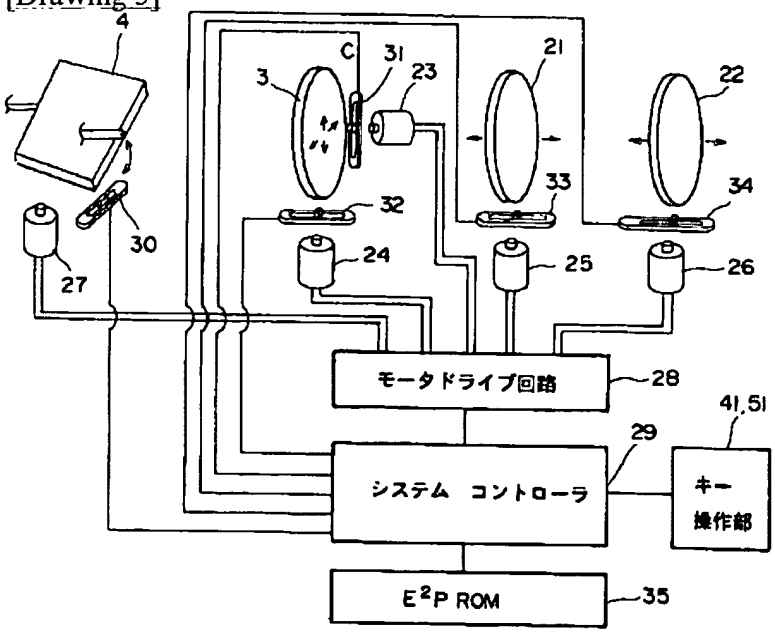
[Drawing 7]



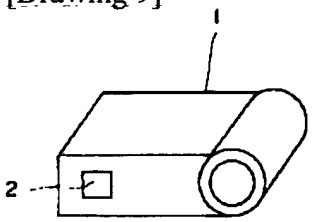
[Drawing 8]



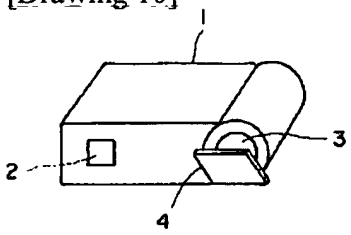
[Drawing 5]



[Drawing 9]



[Drawing 10]



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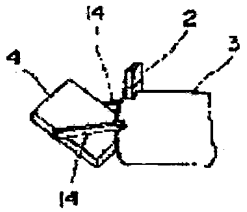
(54) LIQUID CRYSTAL PROJECTOR

(57)Abstract:
PURPOSE: To provide the liquid crystal projector which easily enables remote operations with a single light reception part by providing the light reception part adjacently to a projective lens receiving infrared light emitted from a remote control transmitter.
CONSTITUTION: In the liquid crystal projector provided with a projective lens 3 for projecting images displayed at a liquid crystal panel onto a screen and a light reception part 2 to receive infrared light emitted from the remote control transmitter, the light reception part 2 is provided adjacently to the projective lens 3. Thus, when light emitted from the lens 3 is bent upward by a mirror 4 and projected on the screen provided upward, the infrared light emitted from the remote control transmitter is reflected on the screen, further reflected by the mirror 4 and received at the light reception part 2. Therefore, even when bending the projected light of the lens 3 with the mirror 4, the infrared light emitted from the remote control transmitter and reflected on the screen can be received by one light reception part 2, and the structure can be simplified.



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[Claim(s)]
[Claim 1] The liquid crystal projector characterized by having approached said projection lens and preparing said light sensing portion in the liquid crystal projector equipped with the projection lens which projects on a screen the image displayed on the liquid crystal panel, and the light sensing portion which receives the infrared light which emits from a remote control transmitter.
[Claim 2] The liquid crystal projector according to claim 1 characterized by preparing the mirror which bends the outgoing radiation light of a projection lens in the front face of a projection lens.
[Claim 3] The liquid crystal projector according to claim 1 or 2 characterized by making a mirror rotatable to the optical axis of a projection lens.
[Claim 4] The projection lens which projects on a screen the image displayed on the liquid crystal panel, The detecting-element material which is a liquid crystal projector equipped with the lens driving member which moves said projection lens in parallel to an optical axis, and the mirror which is prepared in the front face of said projection lens, and bends the outgoing radiation light of said projection lens, and detects the location of said mirror, The liquid crystal projector characterized by having the control-section material which controls the driving direction of said lens driving member with the location of said mirror which said detecting-element material detected.
[Claim 5] A lens driving member is a liquid crystal projector according to claim 4 characterized by being operated by the key stroke section prepared in the projector body or the remote control transmitter.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
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[Industrial Application] This invention relates to the liquid crystal projector which projects an image on a screen using a liquid crystal panel.
[0002]
[Description of the Prior Art] Conventionally, what is called the liquid crystal projector which used the liquid crystal panel as a color picture indicating equipment of a projection mold is developed. The color is separated into three colors of red light, green light, and blue glow with a dichroic mirror, and this liquid crystal projector arranges a liquid crystal panel to the optical path of each decomposed color, after making a parallel ray light from the light source of a xenon lamp etc. by the optical member. And after making the red image, green image, and blue image of the image to project form in the liquid crystal panel of each optical path and making the beam of light of each optical path it at red color image light, green color image light, and blue color image light, each **** is compounded with a dichroic mirror and a screen is made to carry out expansion tracing of the synthetic light through a projection lens.
[0003] In addition, by the easy liquid crystal projector, a configuration displays a color picture on the liquid crystal panel of one sheet, and carries out incidence to this liquid crystal panel of one sheet, without making the color of the light from the light source separate, and some which display the transmitted light of the liquid crystal panel of one sheet on a direct screen have it.
[0004] thus, with having constituted, like the projector which used the conventional CRT, unlike that by which the image display section itself served as the light source, since the liquid crystal panel and the light source which are the image display section were another object, it corresponded to the brightness of the light source -- high -- since resolution is decided with a liquid crystal panel while a brightness image is obtained, it becomes possible to project the image of high brightness and high resolution.
[0005] Moreover, there are some which have a remote control transmitter for carrying out long distance actuation in this kind of projector. However, it is difficult to turn a transmitter to a projector and to operate it with the front, back, and the upper part, since the installation of a projector is various. For this reason, discharge infrared light toward a screen from a transmitter, and it is made to reflect with a screen, and as shown in drawing 9 , incidence is carried out to the light sensing portion 2 prepared in the front face of a projector 1.
[0006] Furthermore, in order to change the image projection direction into this kind of projector, there are some which inclined in the front face of the projection lens 3 of a projector 1 to the optical axis, and attached the reflective mirror 4 in it as shown in drawing 10 . There are what was built in in the projector 1, and a thing attached in the front face of a projector 1 as an option in this reflective mirror 4.
[0007] On the other hand, as these people proposed as a patent application of a reference number S91105989 on April 27, Heisei 4, arrangement of a projector is not appropriate, and in order to prevent distortion occurring on the projection image on a screen, there is also a thing of a configuration of having made the projection lens 3 movable in parallel at the optical axis.
[0008]
[Problem(s) to be Solved by the Invention] However, as shown in drawing 10 , when the reflective mirror 4 is formed in the front face of the projection lens 3 and the light sensing portion 2 is formed in the front face of a projector 1, it reflects with a screen and incidence of the infrared light discharged from the remote control transmitter toward the screen on the optical axis of the reflected light of the reflective mirror 4 is carried out to the top face of a projector 1 in which the light sensing portion 2 is not formed. For this reason, there was a problem that light-receiving became impossible. Although this problem was solved when forming two or more light sensing portions 2, there was a design top problem of the design top of a projector and a circuit, and implementation was difficult.
[0009] When the projection lens 3 was moved by the actuation key in parallel with an optical axis and the key stroke was performed on the other hand while the user looked at the projection image on a screen, when the projection image on which it was projected on the screen by the reflective mirror 4 was [the upper and lower sides or right and left] reversed in order to prevent distorted generating of the display image on a screen, a possibility that the migration direction of the projection lens 3 may become reverse to the right migration direction was.
[0010] This invention was made in view of such a situation, and the 1st invention only prepares one light sensing portion in the projector in which the reflective mirror was prepared, and aims at offering the liquid crystal projector which can operate by remote control easily.
[0011] Moreover, the 2nd invention aims at offering the liquid crystal projector which can carry out the key stroke

of the migration direction of the projection lens for distorted amendment etc. in the direction of the right, also when a projection image is in the condition that it was reversed in the direction of four directions.
[0012]
[Means for Solving the Problem] A liquid crystal projector according to claim 1 is characterized by having approached the projection lens 3 and forming a light sensing portion 2 in the liquid crystal projector equipped with the projection lens 3 which projects on a screen the image displayed on the liquid crystal panel, and the light sensing portion 2 which receives the infrared light which emits from a remote control transmitter.
[0013] A liquid crystal projector according to claim 2 is characterized by forming the mirror 4 which bends the outgoing radiation light of the projection lens 3 in the front face of the projection lens 3.
[0014] It is characterized by a liquid crystal projector according to claim 3 making a mirror 4 rotatable to the optical path of the projection lens 3.
[0015] The projection lens 3 which projects on a screen the image as which the liquid crystal projector according to claim 4 was displayed on the liquid crystal panel, The 1st motor 23 and 2nd motor 24 as a lens driving member which move the projection lens 3 in parallel with an optical axis, The switches 61 and 63 as detecting-element material which is a liquid crystal projector equipped with the mirror 4 which is prepared in the front face of the projection lens 3, and bends the outgoing radiation light of the projection lens 3, and detects the location of a mirror 4, It is characterized by having the system controller 31 as control-section material which controls the driving direction of the 1st motor 23 and the 2nd motor 24 with the location of the mirror 4 which switches 61 and 63 detected.
[0016] A liquid crystal projector according to claim 5 is characterized by motors 23 and 24 being operated by the key stroke sections 41 and 45 prepared in projector 1 body or the remote control transmitter.
[0017]
[Function] In a liquid crystal projector according to claim 1 to 3, it reflects with a screen, it reflects further by the mirror 4 prepared in the front face of a projector lens 3, and incidence of the infrared light emitted from the remote control transmitter is carried out to a light sensing portion 2. Since a light sensing portion 2 approaches a projector lens 3 and is prepared at this time, incidence of the infrared light reflected by the mirror 4 can be carried out to a light sensing portion 2.
[0018] When the light which carries out outgoing radiation to claims 4 and 5 from a projector lens 3 by the mirror 4 in the liquid crystal projector of a publication bends, the projection image which fluctuated or was [right-and-left] reversed has copied out on the screen and a switch 61 detects the location of a mirror 4, the 1st and 2nd motor 23 and 24 is reversed. For this reason, while a user looks at the projection image on a screen, when performing a key stroke, gate correction etc. can be made by pressing the key of the same direction as the direction of [on a screen].
[0019]
[Example] Hereafter, the example of the liquid crystal projector of this invention is explained with reference to a drawing.
[0020] The 1st configuration of the example of invention is shown in drawing 1 thru/or drawing 4 , and the 2nd configuration of the example of invention is shown in drawing 4 thru/or drawing 8 . In these drawings, the same sign is given to the parts of drawing 9 and the conventional example shown in 10, and a corresponding part.
[0021] The configuration of the projection direction adjustable mirror built-in projector 1 is shown in drawing 1 thru/or drawing 3 . The location of a projector lens 3 is countered and apertures 12 and 13 are formed in the ****-like the front face and top face of a housing 11 which are shown in drawing 3 , respectively. in a housing 11, as shown in drawing 1 and drawing 2 , the projection lens 3 contains — having — **** — the optical axis of the projection lens 3 — an aperture 12 — it passes along the core mostly. The reflective mirror 4 is supported rotatable through one pair of arms 14 by the front end of the projection lens 3. And as shown in drawing 1 , when the reflective mirror 4 considers as the include angle of 45 degrees to the optical axis of the projection lens 3, outgoing radiation of the reflected light is carried out to the upper part through an aperture 13. Moreover, if the reflective mirror 4 is lowered and it is made to evacuate from the optical axis of the projection lens 3 as shown in drawing 2 , the light emitted from the projection lens 3 will go straight on, and outgoing radiation will be carried out from an aperture 12. Moreover, the light sensing portion 2 is attached so that a light-receiving side may become a right angle to the optical axis of the projection lens 3 at the front end periphery of the projection lens 3.
[0022] As the above-mentioned configuration is shown in drawing 1 , the light emitted from the projection lens 3 bends up by the reflective mirror 4, when projected by the screen which was formed in the upper part and which is not illustrated, it is reflected by the screen, it is further reflected by the reflective mirror 4, and the infrared light emitted from the remote control transmitter is received by the light sensing portion 2. Moreover, as shown in drawing 2 , incidence of the infrared light which the reflective mirror 4 had evacuated from the optical axis of the projection lens 3, emitted from the remote control transmitter when the light emitted from the projection lens 3 went straight on, and was reflected by the screen is carried out to a light sensing portion 2 as it is, and it is received.
[0023] According to this example, even when it bends the projection light of the projection lens 3 by the reflective mirror 4, it can emit from a remote control transmitter and the infrared light reflected on a screen can be received by one light sensing portion 2. Therefore, structure becomes easy and design nature's improves.
[0024] Other examples of the 1st invention are shown in drawing 4 . At this example, the reflective mirror 4 is attached with the same attachment structure as what is shown in the front face of a housing 1 at drawing 1 by the case where it attaches in a projector 1 by making the reflective mirror 4 into an option. And the light sensing portion

2 is formed in the location which can counter the mirror 4 of the front face of a housing 1. The same effectiveness as the case of said example is acquired by this example.
[0025] The 2nd configuration of the example of invention is shown in drawing 5 thru/or drawing 8 . In drawing 5 , in the housing of a projector 1, the projection lens 3, the focal lens 21, and the zoom lens 22 are formed on the same optical axis, and the reflective mirror 4 is attached rotatable ahead of the projection lens 3. The projection lens 3 is moved to the upper and lower sides and a longitudinal direction by the 1st and 2nd motors 23 and 24. Moreover, the focal lens 21 and a zoom lens 22 are moved in the direction of an optical axis by the 3rd and 4th motors 25 and 26, respectively. Furthermore, the rotation drive of the reflective mirror 4 is carried out by the 5th motor 27. And drive control of each motor 23 thru/or 27 is carried out by the system controller 29 through the motor drive circuit 28. Furthermore, the sensors 30, 31, 32, 33, and 34 which detect each movement magnitude are formed in the reflective mirror 4 and each lenses 3, 21, and 22, and it connects with the system controller 29 electrically, respectively.
[0026] the key stroke section 41 shown in drawing 6 is formed in the projector 1, and the signal over the 1st motor 23, 2nd motor 24, and 5th motor 27 is switched to the key stroke section 41 — the vertical reversing switch 42, the right-and-left reversing switch 43, and MIRASUITCHI 44 are formed, respectively. Moreover, the keys 45a and 45b which move the projection lens 3 in the vertical direction by the motor 23, and the keys 46a and 46b which move the projection lens 3 to a longitudinal direction by the motor 24 are formed. Moreover, as shown also in the remote control transmitter which is not illustrated at drawing 7 , the same key stroke section 51 is formed. And the key stroke sections 41 and 51 are connected to the system controller 31, and E2ROM35 which writes in the conditions set up by the key stroke sections 41 and 51 is connected to the system controller 31.
[0027] On the other hand, the switch 61 which serves as ON when the reflective mirror 4 is built in and the reflective mirror 4 leans 45 degrees to an optical axis, as shown in drawing 8 , and the switch 63 which serves as ON when the projection lens 3 is equipped with the option mirror 62 are formed at the tip of the projection lens 3. ON and the OFF signal which are emitted from switches 61 and 63 are inputted into a system controller 31.
[0028] Next, an operation of this example is explained with reference to Table 1.
[0029]
[Table 1]

投射映像状態			本体，リモコン，キー			
MIRROR	上下反転	左右反転	⇩	⇧	⇦	⇨
			TILT・モータ		PAN・モータ	
正面投射 ミラー角度 0°	ON	ON	正転	逆転	逆転	正転
		OFF	正転	逆転	正転	逆転
	OFF	ON	逆転	正転	逆転	正転
		OFF	逆転	正転	正転	逆転
上方投射 ミラー角度 45°	ON	ON	正転	逆転	正転	逆転
		OFF	正転	逆転	逆転	正転
	OFF	ON	逆転	正転	正転	逆転
		OFF	逆転	正転	逆転	正転

[0030] A user operates the key stroke sections 41 or 51, looking at a screen, and makes gate correction of the image projected on the screen. When it is the case where a mirror include angle is 0 times, and 45 degrees, at this time, the hand of cut of the motors 23 and 24 when pressing keys 45 and 46 changes with combination in case the vertical reversing switch 42 and the right-and-left reversing switch 43 are ON and OFF, respectively. That is, when light is projected, for example for a mirror include angle up from the projection lens 3 at 45 degrees, the hand of cut of the motor 23 when pressing a key 45 becomes reverse by setting the vertical reversing switch 42 to OFF. Consequently, the migration direction seen from [of the image on which it was projected] normal, and a key 45 can be made to correspond.

[0031] When the location data which the sensors 31 and 32 of the projection lens 3 detected at this time become the maximum allowed value of a driving direction, a drive instruction in the motor drive circuit 30 is made for a stop and an image not to lack a system controller 31. That is, if it continues pressing keys 45 and 46, a system controller 31 will continue transmitting information to the motor drive circuit 30, reading location detection data. If it becomes the maximum to which location detection data were set, even if it continues pressing keys 45 and 46, transmission in a motor drive circuit will be stopped. Henceforth, the change of the motor 23 shown in Table 1 whenever the mirror switch 44, the vertical reversing switch 42, and the right-and-left reversing switch 43 are pushed, and a forward inversion of 24 is performed, and the condition is written in E2PROM35.

[0032] The contents of E2PROM35 remain, even if a power source serves as OFF. Moreover, at the time of the next power-source **** going up, the information on a front final state is read from E2PROM35, and same processing is performed at it. In addition, it begins from the condition of zero mirror include angle, the vertical reversing switch 42, and right-and-left reversing-switch 43OFF at the time of an initial start.

[0033] Even if the image projected by the reflective mirror 4 on the screen is in the condition reversed to the upper and lower sides and a longitudinal direction, the direction of keys 45 and 46 of operation can be made according to this example, to correspond on the basis of the direction which looks at a projection image to normal, when a user moves a projection image vertically and horizontally by the actuation key.

[0034] Although the above-mentioned example explained the case where the gate of the image on which the projection lens 3 was moved and it was projected on the screen was corrected, the same effectiveness is acquired even if it applies to other equipments which can move a projection image.
[0035] Moreover, although the projection lens 3 was moved and the projection image was moved in the above-mentioned example, also when moving the base in which the projector 1 whole or a projector 1 is laid, it can apply.
[0036]
[Effect of the Invention] Since according to the liquid crystal projector according to claim 1 to 3 the projection lens was approached and the light sensing portion which carries out incidence of the infrared light which emitted from the remote control transmitter and was reflected with the screen was prepared as explained above, even when the outgoing radiation light from a projection lens is bent by the mirror, infrared light is reflected by the mirror and incidence can be carried out to a light sensing portion.
[0037] Moreover, since according to the liquid crystal projector given in claims 4 and 5 the location of a mirror is detected and the migration direction of a projection lens was controlled, when the image projected on the screen is reversed to the upper and lower sides and right and left and a key stroke is performed while a user looks at the projection image on a screen, gate correction etc. can be made in the same direction as the direction of [on a screen] by pressing a key.

[Translation done.]

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the perspective view showing the configuration of the important section in upper part projection of one example of invention of the 1st of the liquid crystal projector of this invention.
[Drawing 2] It is the perspective view showing the configuration of the important section in transverse-plane projection of drawing 1 .
[Drawing 3] It is the perspective view showing the 1st configuration of the housing of one example of invention.
[Drawing 4] It is the appearance perspective view showing the 1st configuration of other examples of invention.
[Drawing 5] It is the functional block diagram showing the configuration of the 2nd of one example of invention of the liquid crystal projector of this invention.
[Drawing 6] It is the explanatory view showing the configuration of the key stroke section prepared in the projector of drawing 5 .
[Drawing 7] It is the explanatory view showing the configuration of the key stroke section prepared in the remote control transmitter used for the projector of drawing 5 .
[Drawing 8] It is the explanatory view showing the configuration of the mirror switch formed in the projector of drawing 5 , and an option mirror.
[Drawing 9] It is the appearance outline perspective view showing the configuration of an example of the conventional projector.
[Drawing 10] It is the appearance outline perspective view showing the configuration of other examples of the conventional projector.
[Description of Notations]
2 Light Sensing Portion
3 Projection Lens
4 Reflective Mirror
23 24 Motor (driving member)
31 System Controller (Control-Section Material)
41 51 Key stroke section
61 63 Switch (detecting-element material)

[Translation done.]

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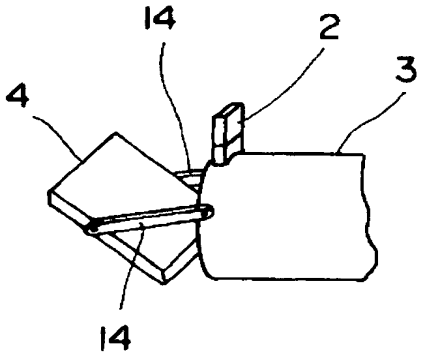
(54)【発明の名称】　液晶プロジェクタ

(57)【要約】

【目的】　反射ミラーが設けられたプロジェクタに１個の受光部を設けるだけで、容易に遠隔操作が行なえるようにし、また、投写映像が上下左右方向に反転した状態にあるときも、投写レンズをキー操作により正しい方向に移動できるようにする。

【構成】　受光部２を投写レンズ３に近接して設ける。また、反射ミラー４の位置に応じて投写レンズの移動方向を逆転させる。



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【特許請求の範囲】

【請求項１】　液晶パネルに表示された画像をスクリーン上に投写する投写レンズと、
リモコン送信機から発する赤外光を受光する受光部とを備えた液晶プロジェクタにおいて、
前記受光部を前記投写レンズに近接して設けたことを特徴とする液晶プロジェクタ。

【請求項２】　投写レンズの出射光を曲折するミラーを投写レンズの前面に設けたことを特徴とする請求項１記載の液晶プロジェクタ。

【請求項３】　ミラーを投写レンズの光軸に対して回動可能としたことを特徴とする請求項１または２記載の液晶プロジェクタ。

【請求項４】　液晶パネルに表示された映像をスクリーンに投写する投写レンズと、
前記投写レンズを光軸に対して平行に移動するレンズ駆動部材と、
前記投写レンズの前面に設けられ前記投写レンズの出射光を曲折するミラーとを備える液晶プロジェクタであって、
前記ミラーの位置を検出する検出部材と、前記検出部材が検出した前記ミラーの位置により、前記レンズ駆動部材の駆動方向を制御する制御部材とを備えることを特徴とする液晶プロジェクタ。

【請求項５】　レンズ駆動部材はプロジェクタ本体またはリモコン送信機に設けられたキー操作部により操作されることを特徴とする請求項４記載の液晶プロジェクタ。

【発明の詳細な説明】

【０００１】

【産業上の利用分野】本発明は、液晶パネルを使用してスクリーン上に画像を投写する液晶プロジェクタに関する。

【０００２】

【従来の技術】従来、投写型のカラー画像表示装置として、液晶パネルを使用した液晶プロジェクタと称されるものが開発されている。この液晶プロジェクタは、キセノンランプなどの光源からの光を光学部材により平行光線とした後、ダイクロイックミラーにより赤色光、緑色光及び青色光の３色に色分解し、分解したそれぞれの色の光路に液晶パネルを配置する。そして、それぞれの光路の液晶パネルに、投写する映像の赤色画像、緑色画像及び青色画像を形成させて、各光路の光線を赤色像光、緑色像光及び青色像光にした後、それぞれの像光をダイクロイックミラーにより合成し、合成光を投写レンズを介してスクリーンに拡大透写させるものである。

【０００３】なお、構成が簡単な液晶プロジェクタでは、１枚の液晶パネルにカラー画像を表示させて、光源からの光を色分解させずに、この１枚の液晶パネルに入射させ、１枚の液晶パネルの透過光を直接スクリーンに

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表示させるものもある。

【０００４】このように構成したことで、従来のＣＲＴを使用したプロジェクタのように、画像表示部自体が光源を兼ねたものとは異なり、画像表示部である液晶パネルと光源とが別体であるため、光源の明るさに対応した高輝度な画像が得られると共に、液晶パネルにより解像度が決まるため、高輝度且つ高解像度の画像を投写することが可能になる。

【０００５】また、この種のプロジェクタには遠距離操作するためのリモコン送信機を有するものがある。しかしプロジェクタの設置場所が前方、後方、上方とさまざまであるので、送信機をプロジェクタに向けて操作することが困難である。このため、送信機から赤外光をスクリーンに向って発射し、スクリーンによって反射させて、図９に示すように、プロジェクタ１の前面に設けられた受光部２に入射させている。

【０００６】さらに、この種のプロジェクタには映像投写方向を変えるため、図１０に示すようにプロジェクタ１の投写レンズ３の前面に、光軸に対して傾斜して反射ミラー４を取り付けたものもある。この反射ミラー４には、プロジェクタ１内に内蔵されたものと、オプションとしてプロジェクタ１の前面に取り付けるものとがある。

【０００７】一方、本出願人が平成４年４月２７日に整理番号Ｓ９１１０５９８９の特許願として提案したように、プロジェクタの配置が適切でなく、スクリーン上の投写映像に歪が発生することを防ぐために、投写レンズ３を光軸に平行に移動可能とした構成のものもある。

【０００８】

【発明が解決しようとする課題】しかしながら、図１０に示すように、投写レンズ３の前面に反射ミラー４が設けられ、プロジェクタ１の前面に受光部２が設けられている場合、反射ミラー４の反射光の光軸上にあるスクリーンに向ってリモコン送信機から発射した赤外光はスクリーンによって反射し、受光部２が設けられていないプロジェクタ１の上面に入射する。このため、受光が不可能になるという問題があった。受光部２を複数個設ければこの問題は解決するが、プロジェクタのデザイン上及び回路の設計上問題があり、実現は困難であった。

【０００９】一方、スクリーン上の表示画像の歪の発生を防ぐために、投写レンズ３を光軸に平行に操作キーによって移動する場合、反射ミラー４によってスクリーン上に投射された投写映像が、上下または左右が反転したときに使用者がスクリーン上の投写映像を見ながらキー操作を行なうと、投写レンズ３の移動方向が正しい移動方向に対して逆になるおそれがあった。

【００１０】本発明はこのような状況に鑑みてなされたもので、第１の発明は、反射ミラーが設けられたプロジェクタに１個の受光部を設けるだけで、容易に遠隔操作を行なうことのできる液晶プロジェクタを提供すること

を目的とする。

【００１１】また第２の発明は、投写映像が上下左右方向に反転した状態にあるときにも、歪補正などのための投写レンズの移動方向を正しい方向にキー操作することのできる液晶プロジェクタを提供することを目的とする。

【００１２】

【課題を解決するための手段】請求項１に記載の液晶プロジェクタは、液晶パネルに表示された画像をスクリーン上に投写する投写レンズ３と、リモコン送信機から発する赤外光を受光する受光部２とを備えた液晶プロジェクタにおいて、受光部２を投写レンズ３に近接して設けたことを特徴とする。

【００１３】請求項２に記載の液晶プロジェクタは、投写レンズ３の出射光を曲折するミラー４を投写レンズ３の前面に設けたことを特徴とする。

【００１４】請求項３に記載の液晶プロジェクタはミラー４を投写レンズ３の光路に対して回動可能としたことを特徴とする。

【００１５】請求項４に記載の液晶プロジェクタは、液晶パネルに表示された映像をスクリーン上に投写する投写レンズ３と、投写レンズ３を光軸に平行に移動するレンズ駆動部材としての第１のモータ２３及び第２のモータ２４と、投写レンズ３の前面に設けられ投写レンズ３の出射光を曲折するミラー４とを備える液晶プロジェクタであって、ミラー４の位置を検出する検出部材としてのスイッチ６１，６３と、スイッチ６１，６３が検出したミラー４の位置により、第１のモータ２３及び第２のモータ２４の駆動方向を制御する制御部材としてのシステムコントローラ３１とを備えることを特徴とする。

【００１６】請求項５に記載の液晶プロジェクタは、モータ２３，２４はプロジェクタ１本体またはリモコン送信機に設けられたキー操作部４１，４５により操作されることを特徴とする。

【００１７】

【作用】請求項１乃至３に記載の液晶プロジェクタにおいては、リモコン送信機から発した赤外光はスクリーンにより反射し、投射レンズ３の前面に設けられたミラー４によりさらに反射して受光部２に入射する。このとき、受光部２は投射レンズ３に近接して設けられているので、ミラー４により反射された赤外光を受光部２に入射することができる。

【００１８】請求項４及び５に記載の液晶プロジェクタにおいては、ミラー４により投射レンズ３から出射する光が曲折し、スクリーン上に上下または左右反転した投写映像が写し出されているときは、ミラー４の位置をスイッチ６１が検出することにより、第１、第２モータ２３，２４を逆転させる。このため、使用者がスクリーン上の投写映像を見ながらキー操作を行なうとき、スクリーン上の方向と同じ方向のキーを押すことにより、あおり修正などを行なうことができる。

【００１９】

【実施例】以下、本発明の液晶プロジェクタの実施例を図面を参照して説明する。

【００２０】図１乃至図４に第１の発明の実施例の構成を示し、図４乃至図８に第２の発明の実施例の構成を示す。これらの図において、図９，１０に示す従来例の部分と対応する部分には同一の符号を付してある。

【００２１】図１乃至図３に投射方向可変ミラー内蔵型プロジェクタ１の構成を示す。図３に示す角函状の筐体１１の前面及び上面には、投射レンズ３の位置に対向して、それぞれ窓１２，１３が設けられている。筐体１１内には、図１及び図２に示すように、投写レンズ３が収納されており、投写レンズ３の光軸は、窓１２のほぼ中心を通っている。投写レンズ３の前端には、１対のアーム１４を介して反射ミラー４が回動可能に支持されている。そして図１に示すように、反射ミラー４が投写レンズ３の光軸に対して４５度の角度としたとき、反射光は窓１３を通って上方に出射する。また、図２に示すように、反射ミラー４を下げて投写レンズ３の光軸から退避させると、投写レンズ３から発する光が直進し、窓１２から出射するようになっている。また受光部２は、投写レンズ３の前端外周に、受光面が投写レンズ３の光軸に対して直角になるように取り付けられている。

【００２２】上記の構成において、図１に示すように、投写レンズ３から発する光が反射ミラー４により上方に曲折され、上部に設けられた図示しないスクリーンに投射されているときは、リモコン発信機から発した赤外光はスクリーンによって反射され、さらに反射ミラー４によって反射されて受光部２により受光される。また図２に示すように、反射ミラー４が投写レンズ３の光軸から退避しており、投写レンズ３から発する光が直進するときは、リモコン発信機から発しスクリーンによって反射された赤外光は、そのまま受光部２に入射して受光される。

【００２３】本実施例によれば、反射ミラー４により投写レンズ３の投写光を曲折する場合でも、リモコン発信機から発し、スクリーンで反射される赤外光を１個の受光部２で受光することができる。従って、構造が簡単となり、デザイン性も向上する。

【００２４】図４に第１の発明の他の実施例を示す。本実施例では、反射ミラー４をオプションとしてプロジェクタ１に取り付けた場合で、筐体１の前面に図１に示すものと同様の取付構造で、反射ミラー４が取り付けられている。そして筐体１の前面のミラー４に対向可能な位置に受光部２が設けられている。本実施例によっても前記実施例の場合と同様の効果が得られる。

【００２５】図５乃至図８に第２の発明の実施例の構成を示す。図５において、プロジェクタ１の筐体内には、同一光軸上に投写レンズ３、フォーカスレンズ２１、ズ

ームレンズ２２が設けられており、投写レンズ３の前方には反射ミラー４が回動可能に取り付けられている。投写レンズ３は、第１及び第２のモータ２３，２４により上下、左右方向に移動されるようになっている。またフォーカスレンズ２１及びズームレンズ２２は、それぞれ第３及び第４のモータ２５，２６により光軸方向に移動される。さらに反射ミラー４は、第５のモータ２７により回動駆動される。そして各モータ２３乃至２７は、モータドライブ回路２８を介してシステムコントローラ２９により駆動制御される。さらに反射ミラー４、各レンズ３，２１，２２には、それぞれの移動量を検出するセンサ３０，３１，３２，３３，３４が設けられており、それぞれ電気的にシステムコントローラ２９に接続されている。

【００２６】プロジェクタ１には図６に示すキー操作部４１が設けられており、キー操作部４１には、第１のモータ２３、第２のモータ２４及び第５のモータ２７に対する信号の切り換えを行なう、それぞれ上下反転スイッチ４２、左右反転スイッチ４３及びミラスイッチ４４が設けられている。またモータ２３により投写レンズ３を

上下方向に移動させるキー４５ａ，４５ｂとモータ２４により投写レンズ３を左右方向に移動させるキー４６ａ，４６ｂが設けられている。また図示しないリモコン発信機にも、図７に示すように、同様のキー操作部５１が設けられている。そしてキー操作部４１，５１は、システムコントローラ３１に接続されており、システムコントローラ３１には、キー操作部４１，５１により設定された条件を書き込むＥ２ＲＯＭ３５が接続されている。

【００２７】一方、投写レンズ３の先端には、図８に示すように、反射ミラー４が内蔵されている場合に反射ミラー４が光軸に対して４５度傾けたときにＯＮとなるスイッチ６１と、オプションミラー６２を投写レンズ３に装着したときにＯＮとなるスイッチ６３とが設けられている。スイッチ６１，６３から発するＯＮ，ＯＦＦ信号は、システムコントローラ３１に入力される。

【００２８】次に、本実施例の作用を表１を参照して説明する。

【００２９】

【表１】

(5)

7 8

投射映像状態			本体，リモコン，キー			
MIRROR	上下反転	左右反転	⇩	⇧	⇦	⇨
			TILT・モータ		PAN・モータ	
正面投射 ミラー角度 0°	ON	ON	正転	逆転	逆転	正転
		OFF	正転	逆転	正転	逆転
	OFF	ON	逆転	正転	逆転	正転
		OFF	逆転	正転	正転	逆転
上方投射 ミラー角度 45°	ON	ON	正転	逆転	正転	逆転
		OFF	正転	逆転	逆転	正転
	OFF	ON	逆転	正転	正転	逆転
		OFF	逆転	正転	逆転	正転

【００３０】使用者は、スクリーンを見ながらキー操作部４１または５１を操作して、スクリーンに投写された映像のあおり修正を行なう。このとき、ミラー角度が０度の場合と４５度の場合、及び上下反転スイッチ４２、左右反転スイッチ４３がそれぞれＯＮ，ＯＦＦの場合の組合せにより、キー４５，４６を押したときのモータ２３，２４の回転方向が変わる。すなわち、例えばミラー角度が４５度で投写レンズ３から光が上方に投写される場合は、上下反転スイッチ４２をＯＦＦとすることにより、キー４５を押したときのモータ２３の回転方向が逆になる。この結果、投射された映像の正規方向から見た移動方向と、キー４５とを対応させることができる。

【００３１】このとき投写レンズ３のセンサ３１，３２が検出した位置データが駆動方向の最大許容値になったら、システムコントローラ３１はモータドライブ回路３０への駆動命令を止め、映像が欠けないようにする。すなわち、キー４５，４６を押し続けると、システムコントローラ３１は位置検出データを読み込みながらモータドライブ回路３０に情報を送信しつづける。位置検出データが設定された最大値になったら、キー４５，４６を押し続けてもモータドライブ回路への送信を止める。以後、ミラースイッチ４４、上下反転スイッチ４２、左右反転スイッチ４３が押される度に、表１に示すモータ２３，２４の正逆転の切換えを行ない、その状態をＥ２ＰＲＯＭ３５に書き込む。

【００３２】Ｅ２ＰＲＯＭ３５の内容は、電源がＯＦＦとなっても残る。また、次の電源立ち上り時には、Ｅ２ＰＲＯＭ３５から前の最終状態の情報を読み込み、同様の処理を施す。なお、初期スタート時にはミラー角度０度、上下反転スイッチ４２及び左右反転スイッチ４３ＯＦＦの状態から始まる。

【００３３】本実施例によれば、使用者が操作キーで投写映像を上下左右に移動させるとき、反射ミラー４によりスクリーン上に投写された映像が上下、左右方向に反転した状態であっても、投写映像を正規に見る方向を基準にキー４５，４６の動作方向を対応させることができる。

【００３４】上記実施例では、投写レンズ３を移動して

スクリーン上に投射された映像のあおりを修正する場合について説明したが、投写映像を移動できる他の装置に応用しても同様の効果が得られる。

【００３５】また上記実施例では、投写レンズ３を移動して投写映像を移動したが、プロジェクタ１全体またはプロジェクタ１を載置する台を移動させる場合にも応用できる。

【００３６】

【発明の効果】以上説明したように、請求項１乃至３に記載の液晶プロジェクタによれば、リモコン送信機から発し、スクリーンにより反射した赤外光を入射する受光部を投写レンズに近接して設けたので、ミラーにより投写レンズからの出射光を曲折した場合でも、赤外光をミラーにより反射させて、受光部に入射することができる。

【００３７】また、請求項４及び５に記載の液晶プロジェクタによれば、ミラーの位置を検出して投写レンズの移動方向を制御するようにしたので、スクリーンに投写された映像が上下、左右に反転している場合でも、使用者がスクリーン上の投写映像を見ながらキー操作を行なうとき、スクリーン上の方向と同じ方向にキーを押すことにより、あおり修正などを行なうことができる。

【図面の簡単な説明】

【図１】本発明の液晶プロジェクタの第１の発明の一実施例の上方投射の場合の要部の構成を示す斜視図である。

【図２】図１の正面投射の場合の要部の構成を示す斜視図である。

【図３】第１の発明の一実施例の筐体の構成を示す斜視図である。

【図４】第１の発明の他の実施例の構成を示す外観斜視図である。

【図５】本発明の液晶プロジェクタの第２の発明の一実施例の構成を示す機能ブロック図である。

【図６】図５のプロジェクタに設けられたキー操作部の構成を示す説明図である。

【図７】図５のプロジェクタに使用されるリモコン送信機に設けられたキー操作部の構成を示す説明図である。

【図８】図５のプロジェクタに設けられたミラースイッチとオプションミラーの構成を示す説明図である。

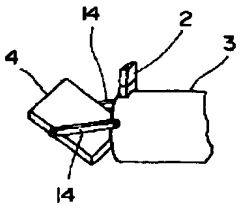
【図９】従来のプロジェクタの一例の構成を示す外観概略斜視図である。

【図１０】従来のプロジェクタの他の一例の構成を示す外観概略斜視図である。

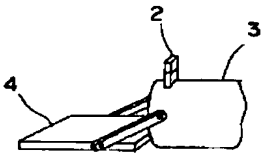
【符号の説明】

２　受光部
３　投写レンズ
４　反射ミラー
２３，２４　モータ（駆動部材）
３１　システムコントローラ（制御部材）
４１，５１　キー操作部
６１，６３　スイッチ（検出部材）

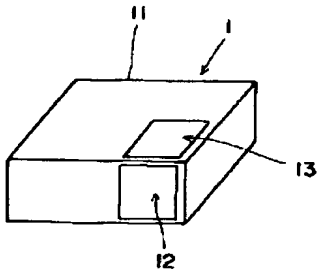
【図１】



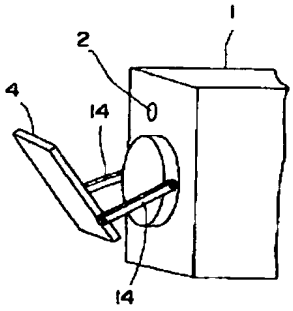
【図２】



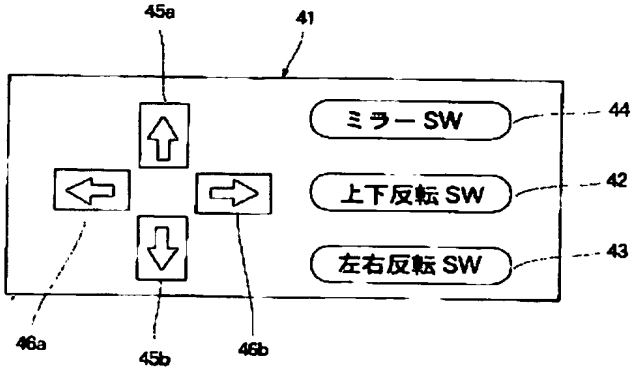
【図３】



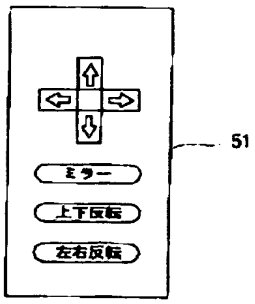
【図４】



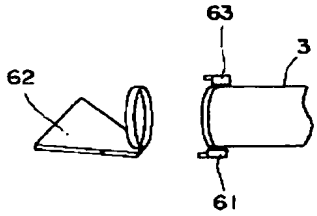
【図６】



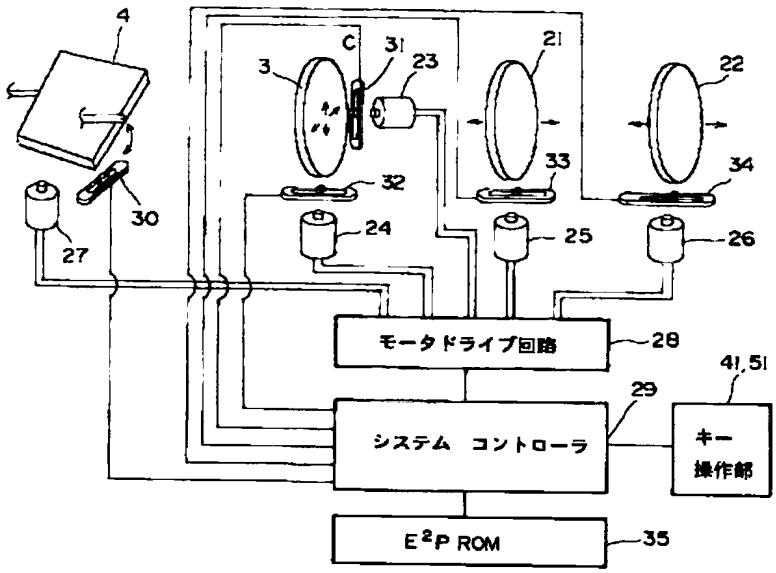
【図７】



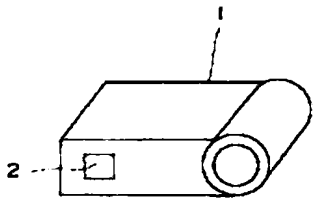
【図８】



【図５】


4
C
31
3
23
21
22
33
34
32
30
27
24
25
26
モータドライブ回路
28
41,51
29
システム コントローラ
キー
操作部
E²P ROM
35

【図９】


1
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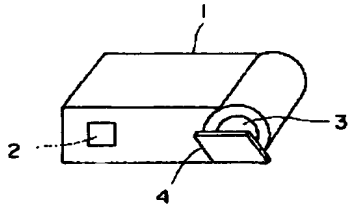
【図１０】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